ADVANCES IN MATHEMATICS 57, 208 (1985)

Book Reviews

D. R. Cox and V. Isham, *Point Processes*, Chapman & Hall, London, 1980, 188 pp.

D. Griffeath, *Additive and Cancellative Interacting Particle Systems*, Springer-Verlag, Berlin/New York, 1979, 108 pp.

P. C. T. van der Hoeven, *Point Processes*, Mathematisch Centrum, 1983, 126 pp.

R. L. Dobrushin and P. Ney (Eds.), *Multicomponent Random Systems*, Dekker, New York, 1980, 606 pp.

R. J. Adler, *The Geometry of Random Fields*, Wiley, New York, 1981, 280 pp.

H. Kesten, *Percolation Theory for Mathematicians*, Birkhaüser, Basel, 1982, 424 pp.

R. T. Smythe and J. C. Wierman, *First-Passage Percolation on the Square Lattice*, Springer-Verlag, Berlin/New York, 1978, 196 pp.

Y. A. Rozanov, *Markov Random Fields*, Springer-Verlag, Berlin/New York, 1982, 201 pp.

R. Rolski, *Stationary Random Processes Associated with Point Processes*, Springer-Verlag, Berlin/New York, 1981, 139 pp.

J. Fritz, J. L. Lebowitz and D. Szasz, *Random fields*, North-Holland, Amsterdam, Vol. I (1981), 568 pp., Vol. II (1981), 1111 pp.

Probability has successfully crashed the dimensional barrier. Only a few years ago self-styled Cassandras could be found who proclaimed the death of probability on the Procrustean bed of the real line. Markov processes, and even, mistakenly, martingales, were seen to be the eternal heirs of stochasticity. These bad dreams ended when Markov random fields, excellently expounded by Rozanov and Adler in their treatise, showed the way to go many-dimensional and keep Markovianness to boot. Things really started to pop when point processes got off the ground. If there ever was a promising open field, with wide frontiers, this is it. Do not listen to the prophets of doom, who preach the primacy of the Poisson process. Read the expositions of Cox, Isham, van der Hoeven, and Rolski and realize that the dominance of the Poisson process will soon be at an end.

As for percolation theory, we have a difficult and impressive achievement in Kesten's treatise. Once you have trained yourself in probability theory by reading Ito and McKean, you will be ready for Kesten. For preliminary muscle-flexing you may peruse Smythe and Wierman, and Griffeath. Percolation theory, so rich in unproved conjectures, has proved to be a tough nut to crack.

The survey volumes edited by Dobrushin and Ney, and Fritz, Lebowitz, and Szasz are outstanding as such volumes go. They range all the way from the renormalization semigroup (misleadingly named the renormalization group) to cluster expansions, automata, limit theorems in statistical mechanics, and even noncommutative probability, a subject to which we hope to come back.

Gian-Carlo Rota
Editor

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